CLAIMS

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- 1. A comiconductor device having a field effect transister formed in a semiconductor layer provided on a insulating layer, compaising:
- a body electrode electrically connected to a channel forming region of said field effect transistor; and
- a back gate electrode provided below the insulating layer as opposed to the channel forming region of said field effect transistor.

2. A semiconductor device having a field effect transistor formed in a semiconductor layer provided on an insulating layer, comprising:

a body electrode electrically connected to a channel forming region of said field effect transistor; and

a back gate electrode provided below the insulating layer as opposed to the channel forming region of said field effect transistor, and

wherein said body electrode and said back gate electrode are respectively formed in a semiconductor region of conduction type opposite to a channel of said field effect transistor.

3. A semiconductor device having a semiconductor

bare in which a record remicenducter layer in fermed on a first remices better layer with an insulating layer interpered thereforeen, and a field effect transistor formed in the record remicenductor layer, comprising:

a body electrode formed in the recond remiconductor layer and comprised of a remiconductor region electrically connected to a channel forming region of said field effect transistor; and

a back gate electrode formed in said first semiconductor layer and comprised of a semiconductor region brought into contact with the insulating layer, and

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wherein said back gate electrode is provided as opposed to the channel forming region of said field effect transistor, and the semiconductor region corresponding to said body electrode and the semiconductor region corresponding to said back gate electrode are respectively formed in a conduction type opposite to a channel of said field effect transistor.

4. The semiconductor device according to any of claims 1 to 3, wherein a potential for controlling carriers of conduction type opposite to a channel formed in an upper portion of the channel forming region of said field effect transistor is applied to each of said body electrode and said back gate electrode.

5. The remicenductor device according to any of claims I to 3, wherein a potential for induction an electrical charge of conduction type eppecite to the channel formed in the upper portion of the channel forming region of said field effect transistor, in a lower portion of said remicenductor layer eppecite to said back gate electrode is applied to each of said body electrode and said back gate electrode.

6. A semiconductor device having a first conduction type field effect transistor and a second conduction type field effect transistor formed in a semiconductor layer provided on an insulating film, comprising:

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a first body electrode electrically connected to a channel forming region of said first conduction type field effect transistor;

a first back gate electrode provided below said insulating layer in an opposing relationship to the channel forming region of said first conduction type field effect transistor;

a second body electrode electrically connected to a channel forming region of said second conduction type field effect transistor; and

a record back gate electrode provided below said insulating layer as opposed to the channel forming region of said second conduction type field effect transistor.

T. A remicenducter device having a first conduction type field effect transister and a record conduction type field effect transister formed in a remisenductor layer provided on an inpulating film, comprising:

a first body electrode electrically connected to a channel forming region of said first conduction type field effect transistor;

a first back gate electrode provided below said insulating layer in an opposing relationship to the channel forming region of said first conduction type field effect transistor;

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a second body electrode electrically connected to a channel forming region of said second conduction type field effect transistor; and

a second back gate electrode provided below said insulating layer as opposed to the channel forming region of said second conduction type field effect transistor, and

wherein said first body electrode and said first back gate electrode are respectively formed in a semiconductor region of conduction type opposite to a channel of said first conduction type field effect transistor, and said second body electrode and said second back gate electrode are respectively formed in a semiconductor region of conduction type opposite to a channel of said second conduction type field effect transistor.

Ease in which a preparation device naving a remigenductor base in which a preparation ductor layer is terred on a first semiconductor layer with an inpulating layer interpored therebetween, and a first conduction type field effect transistor and a second conduction type field effect transistor both formed in the second semiconductor layer, comprising:

a first body electrode formed in the second semiconductor layer and comprised of a semiconductor region electrically connected to a channel forming region of said first conduction type field effect transistor;

a first back gate electrode formed in the first semiconductor layer and comprised of a semiconductor region brought into contact with the insulating layer;

a second body electrode formed in the second semiconductor layer and comprised of a semiconductor region electrically connected to a channel forming region of said second conduction type field effect transistor; and

a second back gate electrode formed in the first semiconductor layer and comprised of a semiconductor region brought into contact with the insulating layer, and

wherein said first back date electrode is provided as opposed to the channel forming region of said first conduction type field effect transistor, said second back

date electrode in provided an expected to the channel terminal region of raid seemed conduction type field effect transistor, the semiconductor region used as raid first body electrode and the remiconductor region used as raid first back gate electrode are respectively formed in a conduction type epporite to a channel of raid first conduction type tield effect transistor, and the semiconductor region used as raid second body electrode and the remiconductor region used as raid second back gate electrode are respectively formed in a conduction type opposite to a channel of said second conduction type field effect transistor.

9. The semiconductor device according to claim 8, wherein the semiconductor region used as said first back gate electrode and the semiconductor region used as said second back gate electrode are respectively electrically separated from said second semiconductor layer.

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10. The semiconductor device according to any of claims 6 to 9, wherein a potential for controlling carriers of conduction type opposite to a channel formed in an upper portion of the channel forming region of said first conduction type field effect transistor is applied to each of said first body electrode and said first back gate electrode, and a potential for controlling carriers of conduction type opposite to a channel formed in an

upper portion of the channel forming region of raid recend conduction type field effect translater is applied to each of raid body electrode and raid back date electrode.

11. The semiconductor device according to any of claims 6 to 9, wherein a potential for inducing an electrical charge of conduction type opposite to the channel formed in the upper portion of the channel forming region of said first conduction type field effect transistor, in a lower portion of said semiconductor layer opposite to said first back date electrode is applied to each of said first body electrode and caid fist back gate electrode, and a potential for inducing an electrical charge of conduction type opposite to the channel formed in the upper portion of the channel forming region of said second conduction type field effect transistor, in a lower portion of said semiconductor layer opposite to said second back gate electrode is applied to each of said second body electrode and said second back gate electrode.

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having a field effect transistor formed in a semiconductor layer provided on an insulating layer, a body electrode electrically connected to a channel forming region of said field effect transistor, and a

back date electrode provided below the insulating layer in an epperiod relationship to the channel forming region of said file Leffect transistor, compaining the following step of:

an electrical charge of conduction type opposite to a channel formed in a surface layer of the channel forming region of said field effect transistor, in a lower portion of the channel forming region thereof to said body electrode and said back gate electrode or at least said back gate electrode so as to increase a threshold voltage of said field effect transistor.

having a field effect transistor formed in a semiconductor layer provided on an insulating layer, a body electrode electrically connected to a channel forming region of said field effect transistor, and a back gate electrode provided below the insulating layer in an opposing relationship to the channel forming region of said filed effect transistor, comprising the following step of:

applying a potential lying in a direction to induce an electrical charge of conduction type opposite to a channel formed in a surface layer of the channel forming region of said field effect transistor, in a lower portion of the channel forming region thereof to said

body electrode and raid back date electrode or at learn raid hack date electrode result to reabilize a threshold veltade of raid field effect transistor and increase a withstand voltage of the drain thereof.

14. A method of driving a remiconductor device having a first conduction type field effect transistor and a second conduction type field effect transistor both formed in a semiconductor layer provided on an insulating layer, a first body electrode electrically connected to a channel forming region of said first conduction type field effect transistor, a first back gate electrode provided below the insulating layer as opposed to the channel forming region of said first conduction type field effect transistor, a second body electrode electrically connected to a channel forming region of said second conduction type field effect transistor, and a second back gate electrode provided below the insulating layer as opposed to the channel forming region of said second conduction type field effect transistor, comprising the following steps of:

in a first conduction type field effect transistor and a second conduction type field effect transistor constituting a predetermined circuit block, applying a potential lying in a direction to induce an electrical charge of conduction type opposite to a channel formed in a surface layer of the channel forming region of said

first completion type field effect transistor, in a lower portion of the enumer torming region thereof to said first body electrode and said first back gate electrode or at least raid first back date electrode so as to increase a threshold voltage of said first conduction type field effect transistor to thereby allow low power consumption, applying a potential lying in a direction to induce an electrical charge of conduction type opposite to a channel formed in a surface layer of the channel forming region of said second conduction type field effect transistor, in a lower portion of the channel forming region thereof to said second body electrode and said second back gate electrode or at least said second back gate electrode so as to increase a threshold voltage of said second conduction type field effect transistor to thereby allow low power consumption, and activating each of a first conduction type field effect transistor and a second conduction type field effect transistor constituting another circuit block at high speed in a state of being brought to a low threshold voltage.

having a first conduction type field effect transistor and a second conduction type field effect transistor both formed in a semiconductor layer provided on an insulating layer, a first body electrode electrically connected to a channel ferming region of said first conduction type

field effect transister, a first back date electrode provided below the insulating layer as epiched to the channel forming region of said first conduction type field effect transister, a second body electrode electrically consisted to a channel forming region of said second conduction type field effect transistor, and a second back gate electrode provided below the insulating layer as opposed to the channel forming region of said second conduction type field effect transistor, comprising the following steps of:

changing with time, potentials applied to said first back gate electrode and said second back gate electrode, or said first back gate electrode, said second back gate electrode, said first body electrode and said second body electrode; and

thereby varying characteristics of said first conduction type field effect transistor and said second conduction type field effect transistor.

having a first conduction type field effect transistor and a second conduction type field effect transistor both formed in a semiconductor layer provided on an insulating layer, a first body electrode electrically connected to a channel forming region of said first conduction type field effect transistor, a first back gate electrode provided below the insulating layer as opposed to the

channel forming region of raid first conduction type field effect transister, a second body electrode electrically connected to a channel forming region of raid second conduction type field effect transistor, and a second back gate electrode provided below the insulating layer as opposed to the channel forming region of said second conduction type field effect transistor, comprising the following step of:

measuring a leak current in a state in which potentials are respectively applied to said first back date electrode and said second back gate electrode, or said first back date electrode, said second back gate electrode, said first body electrode and said second body electrode so as to increase threshold voltages of said first conduction type field effect transistor and said second field effect transistor.

17. A method of aging a semiconductor device having a field effect transistor formed in a semiconductor layer provided on an insulating layer, a body electrode electrically connected to a channel forming region of said field effect transistor, and a back gate electrode provided below the insulating layer as opposed to the channel forming region of said field effect transistor, comprising the following step of:

performing aging in a state in which a potential is applied to said back gate electrode or said back gate

electrode and raid body electrode.

a field effect transistor formed in a semiconductor layer provided on an insulating layer and having a body electrode electrically connected to a channel forming region of said field effect transistor, and a back gate electrode provided below the insulating layer as opposed to the channel forming region of said field effect transistor, comprising the following steps of:

forming a channel of conduction type opposite to a channel formed in a surface layer of the channel forming region of said field effect transistor at a lower portion of the channel forming region thereof, based on a potential applied to said body electrode and a potential applied to said back gate electrode; and

using said semiconductor device in a state in which said former channel and part of a depletion layer of a drain region for said field effect transistor are terminated.

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